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Frozen Embryos, Genetic Information, and Reproductive Rights

Abstract

Recent ethical and legal challenges have arisen concerning the rights of individuals over their IVF embryos, leading to questions about how, when the wishes of parents regarding their embryos conflict, such situations ought to be resolved. A notion commonly invoked in relation to frozen embryo disputes is that of reproductive rights: a right to have (or not to have) children. This has sometimes been interpreted to mean a right to have, or not to have, one's own genetic children. But can such rights legitimately be asserted to give rise to claims over embryos? We examine the question of property in genetic material as applied to gametes and embryos, and whether rights over genetic information extend to grant control over IVF embryos. In particular we consider the purported right not to have one's own genetically related children from a property-based perspective. We argue that even if we concede that such (property) rights do exist, those rights become limited in scope and application upon engaging in reproduction. We want to show that once an IVF embryo is created for the purpose of reproduction, any right not to have genetically-related children that may be based in property rights over genetic information is ceded. There is thus no right to prevent one's IVF embryos from being brought to birth on the basis of a right to avoid having one's own genetic children: although there may be reproductive rights over gametes and embryos, these are not grounded in genetic information.

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Case Study

Of all the controversies surrounding the creation and use of IVF embryos none seem more emotive than when disputes over the fate of the embryos arise between the parties involved. One such recent UK case was that of Natalie Evans. In this case, *Evans v Amicus Healthcare Ltd and Others*¹, Ms Evans was diagnosed with ovarian cancer. Prior to treatment for the cancer she underwent *In Vitro* fertilisation with her partner. Six embryos were created and stored. She subsequently had treatment for the cancer which rendered her infertile. Before any attempt at implantation had taken place the couple separated whereupon Ms Evans' partner, Mr. Johnston, wrote to the fertility clinic asking them to destroy the embryos. Ms Evans brought a claim asking that Mr. Johnston be required to restore his consent to the storage and use of the embryos. The High Court² rejected her claim and this decision was upheld by the court of appeal³. The European Court of Human

¹ [2004] EWCA Civ 727.

² *Evans v Amicus Healthcare Ltd and others* [2003] EWHC 2161 (Fam).

³ *Evans v Amicus Healthcare Ltd and others* [2004] EWCA (Civ) 727.

Rights⁴ also rejected her claim but she has been given leave to appeal to the Grand Chamber of the European Court.

There were undoubtedly a number of significant factors at play in this case but it seems that for Ms. Evans and Mr. Johnston it was the issue of genetics that must have been of overriding importance. That the embryos were their genetic progeny has to be seen to be at the root of the matter, otherwise there could have been no dispute. The reasons for this are clear. Ms. Evans wanted her *own* child and saw this as her only chance to do so following her treatment for ovarian cancer. For her, her *own* child must necessarily mean her own *genetically related* child. If it did not then surely she would have been content to either adopt a child or to use donated gametes to create genetically unrelated embryos for implantation. Equally for Mr. Johnston the important fact was that the embryos were his genetic progeny, and, if implanted, could lead to him having genetically related children. Presumably he would not have been at all bothered had Ms. Evans decided to adopt a child or to undergo *IVF* with the aforementioned donor gametes, he was only concerned about these particular genetically-related embryos.

Genetics, Reproductive Rights, and Parenthood

The above case illustrates, among other issues, the tremendous importance that is placed on genetic relationships by many people in today's society, particularly in relation to reproductive matters. The perceived significance of having one's own biological children has indeed been the primary impetus for the development of many reproductive technologies. *In vitro* fertilisation was designed to enable couples who could not reproduce naturally to conceive their own biological and genetic children, from their own gametes. Donor gametes can be used where one partner is completely infertile, to allow one party at least to serve as a genetic parent if both cannot; in these circumstances it is not uncommon for gametes from a relative of the infertile partner to be used, so that some genetic relationship to both birth parents is maintained⁵. If a woman is unable to carry and bear children, the use of a surrogate birth mother still permits her to have and raise her genetic offspring. All these interventions are now widely used to give people the opportunity to reproduce and pass on their genes who might otherwise have been denied this chance. Further, there are several new technologies still under development which might be applied towards the same goal. Artificial gametogenesis may one day be used to enable people who cannot produce viable gametes (or perhaps even compatible gametes – such as a couple of the same sex) to reproduce genetically; even

⁴ *Evans v United Kingdom* (App No 6339/05) (ECHR).

⁵ L. Halman, A. Abbey & F. Andrews. Attitudes about infertility interventions among fertile and infertile couples. *Am J Public Health* 1992; 82: 191-194.

reproductive cloning has been suggested as a means to allow genetic reproduction, albeit of a slightly different nature⁶.

The extensive use of artificial reproductive technologies and the attention devoted to extending the limits of these methods in order to allow more people to reproduce genetically illustrate the value that is placed on genetic relatedness as a part of parenthood, in addition to birth parentage and upbringing. On the other side of the artificial reproduction equation, the UK's Human Fertilisation and Embryology Authority has recently ruled that children born from donated gametes should be entitled to know their genetic parentage⁷, once again emphasising the socially perceived importance of genetic relationships.

This strong preference that has been demonstrated by prospective parents, to have their own genetic children, is often expressed in terms of reproductive freedom and human rights. The concept of procreative liberty, being the right to control one's own reproduction, has been extensively discussed, both in terms of negative procreative liberty, a right not to reproduce, and a positive entitlement, a right to reproduce⁸. In the context of normal biological reproduction, the practical application of procreative liberty seems relatively straightforward as far as it extends to a right to use contraception to avoid reproduction, and a right to non-interference with one's natural ability to reproduce. When it comes to the use of artificial reproductive technologies, however, the situation is considerably more complex and leads to a myriad of questions about how such rights should be interpreted and applied in this situation.

Reproductive rights are often considered in application to parenthood as a social as well as a biological institution. The meaning of being a parent includes the rearing of children and the establishment of social and familial relationships, not just genetic reproduction. Parenthood is not merely about reproducing one's genes. (This has been used to argue that individuals who are incapable of assuming responsibility and appreciating the social elements of parenthood may not be entitled to the right to be a parent⁹, and that this may therefore place limitations on any rights of access to ART¹⁰.) While most of the questions regarding reproductive rights, ARTs, and parenthood are outside the scope of this paper, we want to consider the case of reproductive rights as they apply to genetic information and the purely genetic component of parenthood. We

See J. Harris. 2004. *On Cloning*. London: Routledge.

⁷ Human Fertilisation and Embryology Authority (Disclosure of Donor Information) Regulations 2004

⁸ See for example J. Harris & S. Holm. 1998. *The Future of Human Reproduction: Ethics, Choice and Regulation*. Oxford: Clarendon Press, J.A. Robertson. 1996. *Children of Choice: Freedom and the New Reproductive Technologies*. Princeton: Princeton University Press, J.A. Robertson. Embryos, families, and procreative liberty: the legal structure of the new reproduction. *South Calif Law Rev* 1986; 59: 939-1041, B. Steinbock. Reproductive rights and responsibilities. *Hastings Cent Rep* 1994; 24: 15-16.

⁹ Steinbock., op cit.

¹⁰ D. Statman. The right to parenthood: an argument for a narrow interpretation. *Ethical Perspect* 2003; 10: 224-235..

are specifically concerned with whether negative procreative liberty entails the right to prevent the implantation, gestation, and bringing to birth of one's embryos¹¹. In particular we are interested in whether any such right can be grounded in genetics.

With regards to the Evans case the question becomes whether or not having entered into an agreement to have genetically-related children, and having taken steps via the IVF clinic towards such an aim, Mr. Johnston could possibly claim a right to not to have the genetically-related children that might result from these embryos.

Approaches to the Dilemma

How to resolve disputes over frozen embryos is a difficult question. Not only do these cases invoke complex emotive and intuitive responses, but numerous moral, ethical, philosophical and cultural factors. Arguments may be produced for each side of the case from perspectives of natural law, justice, sexual morality, bodily integrity, investment theory and more. Balancing these arguments against each other is nigh-impossible and likely to lead to subjective and relativistic conclusions.

We propose instead to dissect out the issues involved using an isolated framework: the concept of embryos as property. There is much to recommend this approach: the existence of a system of property ownership is an almost universal normative institution, as are many aspects of the systems themselves. Property systems are reasonably neutral between varying moral theories, cultures and religions, and therefore allow us to focus on the question under consideration: what rights over embryos arise from property in genetic material? We do not assert that this forms a comprehensive solution to frozen embryo disputes; in fact we acknowledge that there are many other considerations to be taken into account in such cases. However, a property-based approach enables us to consider the problem within a normative framework that can deliver a concrete answer to the specific question of whether rights over genetic information can give rise to rights over IVF embryos.

Property in Genetic Material

That the human body and its parts and products ought to be subject to property considerations is a highly contentious issue.¹² Disagreements

¹¹ Where so doing does not infringe any overriding rights of bodily integrity; in the case of embryos *in utero*, a woman's right to bodily integrity will conflict with the exercise of any negative rights of procreative liberty that might be asserted. We therefore confine our discussion to the case of IVF embryos to avoid confusing the issues.

¹² See G. Calabresi. Do We Own Our Bodies. *Health Matrix* 1991; 1: 5-18, G.A. Cohen. 1995. *Self-Ownership, Freedom and Equality*. Cambridge: Cambridge University Press, R.E. Gold. 1996. *Body Parts: Property Rights and the Ownership of Human Biological Materials* Washington: Georgetown University Press, J.W. Harris. Who Owns My Body. *Oxford J Legal Studies* 1996; 16: 55-84, S.R. Munzer. Kant and Property Rights in Body

regarding this are underlined in discussions regarding genetic material where a double dilemma emerges. Some notable situations in relation to which the existence of property rights in genetic material have been suggested and discussed include cases involving the patenting of genetic information, for purposes such as genetic testing and diagnosis¹³ or as an information resource in itself¹⁴; as well as cases pertaining to the use of genetic material obtained in a diagnostic context for other purposes such as research and profit¹⁵.

To properly consider the question of property rights in genetic material, it is worth dissecting out the concept of what we mean when we refer to "genetic material", and over exactly what aspects of genetic material property rights might be said to exist.

There are two conceptual components of genetic material to which property rights could potentially be applied: these can be termed the physical and the informational. The former consists of the physical substance in which the genetic material is embodied: tissue samples, cells and the DNA itself, the atoms that make up the nucleic acid molecules that hold our genetic code. The latter is the genetic information that is contained within the physical substance: the code itself, the particular arrangement of those atoms that make up the sequences of our genes, the unique combination of genes and DNA sequence that forms an individual genome.

Both the physical and informational components of genetic material might potentially be the subject of property rights, but they are conceptually separable elements in themselves; thus the rights which might attach to each, as well as the grounds and justification for the existence of such rights, can be treated separately. Indeed, there are different arguments which apply to the consideration of rights in genetic information, as opposed to merely the physical genetic material. Part of these arguments turn on the question of whether or not genetic information (not the material upon/within which it is contained) can even properly be thought to be the subject of property rights. It is to this question we now look.

Parts. *Canadian J Law Jurispr* 1993; VI: 319-341, J. Nedelsky. Property in Potential Life? *Canadian J Law Jurispr* 1993; VI: 343-365.

¹³ For example the patents held by Myriad Genetics covering the breast cancer genes BRCA1 and BRCA2, which have been enforced to prevent some researchers from carrying out tests on these genes.

¹⁴ An obvious example of this being the Celera project to sequence the human genome and file patents on some of the information thus gleaned.

¹⁵ Some of the best-known cases in this regard include the Moore case (Moore v Regents of University of California 1990 271 CalRptr 146 Supreme Court of California), in which a cell line was developed and patented from a patient's tissue samples; and the Greenberg case (Greenberg v. Miami Children's Hospital Research Institute, Inc. 2003 264 FSupp2d 1064 United States District Court, S.D. Florida), in which researchers filed a patent on a gene sequence obtained from patients' samples and genetic information. In both of these cases the courts' final legal analysis rejected the idea of property interests in genetic material and biological samples, preferring to frame the patients' rights in other terms; but from a philosophical and ethical perspective the question remains open.

Philosophical and Legal Perspectives

Each of us has particular sets of genes containing our genetic information. These genes, and this information, are unique to each of us. It is like having a personalised identifier number. And it is this fact combined with the ease with which this information can now be obtained and analysed which gives rise to concern. Some of the use that this information can be put to include identifying individuals, determining relatedness between individuals, and the detection genetic mutations and common gene variants. The later two applications can be used to identify and predict certain diseases or risk of disease. In addition to the multitude of applications of genetic material there are also a multitude of individuals and organisations who might be interested in it. Some of these include patients, doctors, researchers, the police, insurance companies, and the government.

With such an array of applications of this uniquely personal information it is not surprising that there are concerns regarding its misuse. Most of these concerns centre on issues of privacy, confidentiality, and control as they relate to genetic material and genetic information. Murray tells us that:

[G]enetic information is sufficiently different from other kinds of health-related information that it needs special protection.¹⁶

This school of thought is dubbed 'genetic exceptionalism' and the genetic exceptionalists argue that:

. . . a property right to one's genetic information would be the most viable means of securing the confidentiality of that information.¹⁷

The justification for why we each should have property rights in our own genetic material and information can be seen as stemming from a Lockean model¹⁸, or more recently from a Nozikean model¹⁹. These models suppose that we all, at least originally, own our own bodies, and that we also own the fruits of our labour. Combining these together Steiner contends that:

Our bodies are factories. They produce things like blood, skin, hair, etc. Self-ownership gives us the titles to these and protects our liberty to dispose of them, just as it does in the case of our non-renewable types of tissue.²⁰

¹⁶ T. Murray. 1997. Genetic Exceptionalism and Future Diaries: Is Genetic Information Different from other Medical Information?' In *Genetic Secrets: Protecting Privacy and Confidentiality* M. Rothstein, ed. New Haven: Yale University Press.

¹⁷ R.A. Spinello. Property rights in genetic information. *Ethics and Inf Tech* 2004; 6: 29-42.

¹⁸ J. Locke. 1964. The Second Treatise of Government: An Essay Concerning the True Original, Extent and End. In *John Locke, Two Treatises of Government: A Critical Edition with an Introduction and Apparatus Criticus*. P. Laslett, ed. Cambridge: Cambridge University Press.

¹⁹ R. Nozick. 1974. *Anarchy, State and Utopia*. Oxford: Basil Blackwell.

²⁰ H. Steiner. 1994. *An Essay on Rights*. Oxford: Blackwell. p.233.

These human materials can be seen as the fruits of our labour, albeit non-voluntary labour. Steiner continues:

We each own the fruits of our labour inasmuch as all the factors entering into their production are either things already owned by us or initially unowned things amounting to no more than an equal portion of them.²¹

If, therefore, we can be said to own and have property rights in the cells which contain our genetic material, and, therefore, to have property rights in our genetic material, then it is at least possible that we could also have these rights in the information contained therein.

However, any property rights in genetic information, properly thought of, could only be intangible property rights²². This is because, as elucidated above, while you may have to go through the physical genetic material to get to the information these two components can be separated and are conceptually different..

There are, of course, opposing arguments advanced against property rights in our genetic information. One might claim that while our genetic information is unique to each of us we share too much of our genetic code with each other (and even with other animals) to justify individuals having exclusive property rights over it. Other objections are based on utilitarian argument and claim that allowing individual exclusive rights will be a deterrent to genetic research and that this would not be in the common good²³. Added to this might be the arguments that we can have only quasi property rights in our genes, that we can have rights in our genetics, but they are not property rights, and that maintain that we merely have interests and not rights in this area.

Whatever the philosophical wrangling surrounding genetics it is clear that, in some form or another, an individual's genetic information does require protection. This is without doubt recognised in law, although trying to untangle the legal genetics web is not easy.

Foster says that:

There are only two uncontroversial things about genetics law . . . The first is that it matters . . . The second thing is that it is a mess.²⁴

He continues saying that:

Bemused English lawyers don't know whether to treat DNA as tangible property or intellectual property or human tissue or information.²⁵

²¹ *Ibid.*, p.236

²² For a discussion of the conditions that must be met to satisfy intellectual property claims, and how these might apply to genetic information, see A.D. Moore. Owning genetic information and gene enhancement techniques: why privacy and property rights may undermine social control of the human genome. *Bioethics* 2000; 14: 97-119..

²³ Spinello., *op cit.*

²⁴ C. Foster. Current Issues in the Law of Genetics. *New Law J* 2003; 153: 29.

The reason for this mess is that the law governing genetics is drawn from a multitude of sources, both common law and statutory, and seems to contain conflicting ideals. To increase the confusion there is also a range of statutes that could potentially be applicable in this area. The genetic subject matter covered ranges from issues of confidentiality and privacy, through the regulation of the reproductive technologies and therapies (including PIGD, stem cell research, and gene therapy), and on to intellectual property in genetic material, and the range of statutes that cover these is even wider.²⁶

While this is somewhat of a mess it cannot be denied that the law does recognise some rights of confidentiality, privacy, and control in both our genetic material and genetic information. That these rights might be property, or at least quasi-property, rights is given further support through our patent laws. The Patents Act 1997 (as amended at 29th April 2006) states that only inventions can be subject to a patent.²⁷ Discoveries are not considered inventions for the purposes of the Act and are, therefore, not patentable.²⁸ In relation to genes and genetics this might seem to imply that genetic information cannot be patentable, being but a 'mere discovery'²⁹ but as Laurie explains finding a technical solution to an unsolved technical problem can overcome this difficulty:

. . . locating a previously unknown gene, determining its function and making it accessible for further exploitation is an example of a technical solution to the pre-existing problem of the inaccessibility of the genetic product.³⁰

This effectively renders the genetic information patentable and the subject of intellectual property rights. It can be seen here that intellectual property rights in genetics are recognised and are offered due legal protection.

Thus it can be seen that both philosophically and legally there are grounds for considering genetic information to be the subject of property rights. These perspectives are not wholly uncontentious but despite continuing debate about whether or not genes and genetic information ought to be considered in this manner, for the purposes of our paper we will assume that they can be. The reason for such a stance is this: if there are no property rights, or at least rights of control in genetic information then there can be no basis for arguments turning on the right not to have your own genetic children. A person must have property rights, or quasi-property rights involving control, over their genetic information if we are to make sense of such claims.

²⁵ *Ibid.*

²⁶ Some of the statutes that cover, or could potentially cover, these include the Data Protection Act 1998, the Human Tissues Act 2004, the Human Fertilisation and Embryology Act 1990, the Health and Social Care Act 2001, and the Human Reproductive Cloning Act 2001. This is all supplemented not only by the relevant common law but by various UK regulations and European directives.

²⁷ The Patents Act 1997 (as amended at 29th April 2006), s. 1(1).

²⁸ *Ibid.*, s. 1(2)(a).

²⁹ G. Laurie. 2004. Patenting and the Human Body. In *Principles of Medical Law*. A. Grubb, ed. 2nd edition edn. Oxford: Oxford University Press: 1079-1102. p.1085.

³⁰ *Ibid.*

Transfer of Genetic Rights

We have thus far established that genetic material can be conceptually divided into physical and informational components, and that both of these could be appropriate subjects for at least quasi-property rights of control.

Given this, it follows that rights of control over genetic material, both physical and information components thereof, like all property rights are transferable and can be ceded. Donating blood involves a transfer of physical rights from the donor to the blood bank; assenting to DNA being extracted from a sample of that blood so that my genes can be sequenced for research involves an additional transfer of informational rights to the researcher; allowing that sequence to be published may well entail a cessation of some informational rights altogether.

Difficult questions arise when the physical and informational properties of genetic material cannot be easily separated. When I send a lock of my hair to someone as a sign of affection, I may have given up the physical property, but that should not entitle him to extract my DNA and make use of the information contained therein; if I consent to allowing my genes to be sequenced but refuse to allow a biological sample to be taken, it will be difficult to give effect to the transfer of informational rights.

Gametes and Embryos

Having decided that the physical and informational components of genetic material and the rights associated with each, are at least conceptually separable, we now turn to considering the application of this model to gametes and embryos in the context of artificial reproductive technologies.

In the case of gametes, this is relatively simple: as for all parts and products of our own bodies, we have rights over our physical gametes (that is, spermatozoa and oocytes) because they are the fruits of our bodies' labour (albeit non-voluntary). The informational rights we may have over gametes are likewise the same as any rights we have over the genetic information contained in the somatic tissues of our bodies, because they are derived from our own genome.

According to our analysis of rights over genetic material as described above, the rights that exist in gametes can also be transferred or ceded. This can be seen to occur when the gametes are given for the purpose of reproduction: donating to a sperm bank involves transferring *physical* control of one's genetic material to another party, as indeed does normal unprotected sexual intercourse. To what extent this also entails transfer or cessation of *informational* rights over the genetic material contained in gametes is perhaps less clear; this will be discussed further below.

When gametes fuse to form an embryo in the process of *in vitro* fertilisation, the individual rights which the gametic progenitors have over the separate gametes are altered. There can be no property or rights claims over those gametes because the two separate gametes no longer exist. In

their place there is an embryo. Embryos can also be viewed as a type of genetic material containing physical and informational property, but both the physical and informational components are contributed to by both parents. In the case of IVF embryos, the fertility clinic also contributes parts (in the form of the culture medium used to nourish the embryos) and labour.³¹

How are we to break down the rights which pertain to embryos on behalf of those who might have a claim? Let us consider first those rights which exist in the physical embryo, that clump of cells which may or may not become a new human being. Both parents have contributed physical material towards the embryo: to whom, then, does it belong?

A consideration of various models of joint property ownership that are invoked when multiple parties contribute to mixed property may be useful at this point. One analysis which has often been applied³² separates mixed property into the categories of miscible and immiscible property.

Immiscible property is mixed property of a form such that the individual contributions of each party can be distinguished and separated: in such a case, each party retains property rights to his or her own contribution. For example, if my herd of black cows is mixed with your herd of white cows, we each retain ownership of our respective cows, as our contributions can be distinguished and separated from each other. Miscible property, by contrast, is mixed property in which the previously separate components cannot be distinguished. When miscible property is created by the mixing of multiple contributions, each contributor becomes a joint or co-owner of the mixed property; the extent of shared ownership may depend on the original contribution given. For example, if we each own a barrel of beer and the contents of the two barrels become mixed, we are now the joint owners of the two barrels, each having a half-share in the total. A further development affecting joint rights is the investment of labour and effort and the creation of something new: this may also alter the balance of rights in joint property. An illustration of this might be if I were to take your flour and combine it with my eggs to bake a cake: the labour I have invested in the baking process and the creation of a substantially different new item from the mixed property ought to give me property rights over the resulting cake, although you would then have a claim against me for the value of your flour.

When we come to consider how this applies to embryos, it seems clear that an embryo is a form of miscible joint property. The component physical contributions of sperm and egg cannot be distinguished and

³¹ The issue of rights over embryos becomes important because of the availability of assisted reproductive technology: if the embryo is in utero, the woman's right to bodily integrity would override any rights of control the father might have over the physical or informational property contained in the embryo.

³² For discussion and comparative analysis see R.W.J. Hickey. Dazed and Confused: Accidental Mixtures of Goods and the Theory of Acquisition of Title. *Mod Law Rev* 2003; 66: 368-383..

separated once fertilisation has occurred: both parents therefore share rights over the physical embryos. Before that point, the sperm and eggs remain separable and separate property rights in them persist, but at the point of fertilisation the material/embryos become joint property, and can therefore be divided amongst the joint owners according to their relative shares³³.

How would the above analysis apply to disputes over frozen embryos? One method of dividing jointly owned embryos into equal shares might be to give them half the embryos each, to do with as they chose; or each embryo could be split to ensure that each party gets an identical, equal share of the property. If the crux of such disputes was only a concern by the parties regarding their physical property then such solutions ought to be perfectly adequate. However, this is not generally perceived to be the case. It is clear that disputes over embryos are not just about the physical embryo(s), but about what the embryo represents and what it might become, that is, a genetically related child.

Reproduction and Genetic Rights

Each of us can claim a set of rights in relation to our genetic information, the most important of these being the right to genetic privacy and the right to control our genetic information. As discussed earlier the recognition of such rights ensures that each individual is protected against the misuse of this information. However, these rights, like all rights, are not absolute, and are necessarily limited by the rights of others and by changing situations.

In the case of reproduction, one's rights over one's genetic information are necessarily altered. If it is accepted that we have some rights to control our genetic information, and if these extend to a right *a priori* not to have children created as a product of our genetic information, then engaging voluntarily in reproduction must entail an intent to give up this right. Consenting to give gametes for the purposes of reproduction (whether by natural or assisted means), as well as often involving a transfer of physical rights, is therefore equivalent to offering to cede one's informational rights for the purpose of creating a new genetic entity.

This proffered cessation of informational rights occurs as a direct result of the agreement to give gametes for the designated purpose. If physical property rights in gametes are transferred for a purpose other than reproduction, such as research, no giving up of an information-based right

³³ The apportionment of shares in joint property is in proportion to the value of the contributions of the property-owners. How this might be determined in relation to IVF embryos is an intriguing question. For example, it might be suggested that the woman should have a greater right because she has contributed more physical material (as the oocyte is physically larger than the sperm) and slightly more of her genetic material (in the form of mitochondrial DNA) to the embryo. One might envision various other circumstances which might change the relative value, objective or subjective, of each partner's contribution. However for the purposes of our analysis, we assume that the value of the property contributed by each parent can be regarded as approximately equal unless otherwise specified.

not to have genetic children created from those gametes has occurred, although other information-based rights may have been ceded as part of the transaction – for example, if the research for the purpose of which the gametes were given involved obtaining and using genetic information from them³⁴. Similarly, ceding of your informational rights for reproductive purposes does not imply the ceding of them for other purposes: providing gametes for IVF does not authorise the clinic to use the genetic information it holds for purposes other than creating an embryo for reproduction³⁵.

The creation of *IVF* embryos for the purposes of reproduction thus represents a special situation where the scope of one's genetic rights becomes limited at the point of fertilisation at which the mixing of genetic material occurs.

The reasons for this have been touched on above. Before 'mixing' the sperm and the ova are the distinct property of their sources. As such those individuals can exercise their rights unhindered over their own gametes. However, once fertilisation has occurred the individuals cannot be seen as having property rights over two distinct entities. If they have property rights at all then they can only be joint property rights over the ensuing embryo(s).

In the Evans case Ms. Evans and Mr. Johnston could be considered to be the joint owner of their six embryos. As with the model of joint ownership outlined above they would share identical claims to the embryos. If these parties had agreed as to the fate of their embryos then there would have been no problems, the embryos would have been implanted, destroyed, or donated for research purposes as they wished. But this, as we saw, was not the case. Now if we submit that the two parties are joint-owners then without adequate justification there can be no trumping claims. If this occurs the embryos are left in a state of limbo – they cannot be destroyed and they cannot be implanted. Would, therefore, Mr. Johnston's claim of a right not to have the possible ensuing genetically related children constitute a justifiable trumping claim?

When Mr. Johnston agreed to engage in *IVF* for the purposes of having a child with Ms. Evans as soon as his sperm fertilised her ovum he ceded any right he might have had not to become the genetic father of the child that embryo would become. This would equally apply had their roles been reversed and he wanted the embryos but she did not. He, however, would have had the additional problem of finding a surrogate to gestate the

³⁴ These rights are often phrased in terms of consent rather than property rights; however as we have discussed, any requirement for consent to the use of genetic material and genetic information implies a right of control over such material in the first place, which can be viewed as a type of property right.

³⁵ This may be illustrated by analogy with the use of other personal information: simply because a patient gives their doctor medical information does not imply that the doctor can use it for any purpose he may choose. The information held on the medical record may be used for the patients own health care. The possession of this information by the doctor does not authorise, without consent, use of the information for other purposes, nor does it imply a wider public access.

embryos for him. Mr. Johnston had effectively given up a portion of the rights he may have had over his genetic information for the purposes of creating a new genetically-related entity. Once his embryo had been created he no longer had the right to prevent its birth on the grounds of not wanting a genetically-related child.

To explain this more fully, let us consider the sequence of events and associated transfers of rights that take place in the creation of IVF embryos. Each parent has *de novo* physical and informational rights over their separate gametes, and at any point up until fertilisation they retain those rights. By proposing to create an embryo, however, each party is offering to cede some part of their informational rights in the gametes that are given with that intent, for the purpose of creating a new form of information: the new genetic entity. When fusion of the egg and sperm to form an embryo occurs, that embryo may be regarded physically as immiscible joint property in which both parents have physical property rights. This also constitutes the formation of the new genetic entity in respect of which informational rights were ceded.

Once this has taken place, the implantation and gestation of the embryo does not involve any further informational use of the genetic material contributed by each party. At the point of fertilisation, the new genetic entity comes into existence; any subsequent changes and developments that happen during the process take place at the physical level, but no further informational manipulation occurs. The genetic information contained in an embryo, or even a fertilised egg, is the same as that contained in the fully-grown infant or adult. There is no point trying to reclaim a right not to have a new genetic entity created from your genetic information when the act of creation has already taken place.

The implication of this is plain and simple: once you have given up your genetic informational rights in this manner you cannot take them back. The creation of IVF embryos involves both parents giving up some rights over their genetic information in pursuit of the creation of the embryos: once this has occurred, any right of the parents not to have those embryos created (as new genetic entities from their genetic information) is lost, and only the physical rights to the embryos persist. By way of example imagine that the IVF clinic could store an embryo's genetic information independent of any physical components contributed by the parents. If they could do this it would be the case that even when the physical embryo was destroyed they could legitimately re-create that embryo for either parent, even in the absence of agreement from the other. Therefore, where there is dispute over the fate of IVF embryos the 'not wanting a genetically-related child' argument from one of the parties cannot supply adequate grounds to prevent the implantation and bringing to birth of the embryos.

All of this, however, is not to say that there can be no grounds upon which to stop the implantation and gestation of those embryos, and eventual birth of a child. Other arguments such as ones surrounding the welfare of the child might suffice, genetic informational or genetic-relatedness ones, however, will not.

Conclusion

In this paper we have argued that the act of creating embryos through IVF constitutes giving up some rights over genetic information specifically for the purposes of reproduction, and that once this has taken place, a right based in genetic information cannot be asserted to prevent one's genetic children being born. We have not, however, attempted to produce a definitive answer to the broader question of whether a general right not to have one's own genetic children exists. Certainly if it does, it is waived at the point of agreeing to reproduce, whether that be by sexual intercourse or *in vitro* fertilisation; but can such a right even be logically and philosophically justified³⁶?

A discussion and analysis of these more general ideas is, unfortunately, outside the scope of this paper. However, we can state some limited conclusions regarding rights over reproduction and genetic information in the context of artificial reproduction and IVF embryos. If gametes and embryos are to be considered as subject to property interests, then the physical material and the genetic information can be treated as separate components of the property. Whilst parents may retain joint physical property rights in the embryos as a result of their physical contributions (in the form of gametes), the changes to informational rights that occur as a result of IVF should be considered differently. We submit that an agreement to create IVF embryos from one's gametes constitutes giving up certain rights over genetic information for the specific purpose of genetic reproduction (that is, creating a new genetic entity using one's genetic information), and that once fertilisation takes place, these rights cease to exist. It may be that the parents have some informational rights that persist in the embryo or resulting child, but they do not have the right to prevent an embryo being brought to birth on genetic grounds. There can, therefore, be no right *not* to have a genetically related child with a partner once *IVF* embryos have been created from your gametes; and where there is dispute over the fate of *IVF* embryos the 'not wanting a genetically related child' argument from one of the parties cannot supply adequate grounds to prevent the implantation and bringing to birth of the embryos.

³⁶ There is an obvious logical objection to the existence of a right not to have one's own genetic children. Consider the situation of identical twins who share the same genetic information. If there were a right not to have your own genetic children, you ought to have the right to stop your twin from reproducing and hence creating offspring who would be genetically yours. As this is evidently not the case, it cannot be that there is always a right to prevent one's genetic children from coming into existence.